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EXAMINER
LUU, THANH X

ART UNIT	PAPER NUMBER
2878	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No. 09/576,654	Applicant(s) WEITEKAMP, DANIEL P.
	Examiner Thanh X Luu	Art Unit 2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 December 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-26,28,29 and 32-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-26,28,29 and 32-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

This Office Action is in response to amendments and remarks filed December 2, 2002. Claims 1-4, 6-26, 28, 29 and 32-50 are currently pending.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the array of mechanical oscillators as claimed in claims 20-26; the probe module including at least another probe as claimed in claim 15, engaging a second probe to a second mechanical oscillator as claimed in claim 40; and the spacing monitor mechanism as claimed in claim 16 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 9 and 16 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 9, page 37 of the specification describes a laser source and an acousto-optical modulator that modulates the output laser beam to produce both the sample and probe excitation wave. The specification fails to enable a laser source that produces one of the sample and probe excitation wave and an acousto-optical modulator which modulates the laser to produce another of the sample and probe excitation waves as claimed.

Applicant cites page 30, lines 19-21 which discloses "The states indicated as on and off might differ only in the distance between the probe and the sample, controlled, for example by piezoelectric or thermal expansion of the probe," to meet the enablement requirement. However, as understood, Examiner could not find any relevance in the cited lines to enable one of ordinary skill in the art to make and use the invention as claimed.

Regarding claim 16, Applicant has failed to describe in the specification of any spacing monitor mechanism to monitor a spacing between the probe and the sample.

Applicant cites page 4, lines 5+; page 9, lines 9+; page 18, line 19+; page 20, lines 10+; page 21, lines 9+ and page 22, lines 3+ as evidence of sufficient enablement. However, in light of the citations, Examiner still could not find how Applicant enables one of ordinary skill in the art to monitor a spacing between the probe and the sample with a spacing monitor mechanism.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 34 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 34, the terms "another <u>electromagnetic</u> polarization" imply that there exists a first <u>electromagnetic</u> polarization. However, no other <u>electromagnetic</u> polarization has been claimed. Furthermore, it is unclear in its given context how another electromagnetic polarization is used to affect the motion of the mechanical oscillator.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-4, 6, 7, 14, 16, 18, 28, 29, 32, 36-39, 43-47, 49 and 50, as understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Holczer et al. (U.S. Patent 5,619,139).

Regarding claim 1, Holczer et al. disclose (see Figures 2, 4, 6 and 7) a system, comprising: a probe module (10), having a probe (26) responsive to a probe excitation field (B_0 or B_1) at a probe excitation frequency to produce a probe polarization (moments; see Figure 4), a sample holder (14) holding a sample (16) which has a sample polarization (moments; see Figure 4) at a sample polarization frequency, and a mechanical oscillator (24) engaged to the probe to move in response to an interaction

between the probe polarization and the sample polarization (see column 14, lines 26-65); a detection module (30, 32) to measure a response of the mechanical oscillator to produce a signal indicative of a property of the sample (atomic structure; see claim 1). That is, the excitation field produces a probe polarization since the probe is polarized (see Figure 4, charges move and the atoms are oriented in certain directions). Holczer et al. also disclose (see Figure 6 and column 18, lines 42-65) the probe frequency (B_0; static field; frequency = 0) and the sample frequency (B_{MOD}; frequency = 10-100kHz) are different from each other by an amount within a frequency response range of the mechanical oscillator (see column 13, lines 19-22; frequency = 10-100kHz).

Regarding claim 28, Holczer et al. disclose (see Figures 2 and 4-7) a method, comprising: producing a probe polarization (see Figure 4) by exposing a probe (26) formed of polarizable material to a probe excitation field (B_0 or B_1) of a probe radiation wave at a probe frequency; using a sample radiation wave (B_{MOD}) at a sample frequency different from the probe frequency to interact with a sample (16) and to produce a sample polarization (see Figure 4), wherein the sample radiation wave and the probe radiation wave are coherent to each other (see column 18, lines 42-63); placing the sample (16) with a sample polarization (see Figure 4) in a field of the probe polarization to effectuate an interaction between the probe and the sample (see Figure 4); engaging a mechanical oscillator (24) to the probe, wherein the oscillator moves in response to the interaction (see column 19, lines 1-5); detecting motion (30, 32) of the oscillator to measure a property of the sample (see claim 1;"atomic structure"). The waves are coherent since the phase differences between the two waves remain the

same. Holczer et al. further disclose (see column 13, lines 19-22 and column 18, lines 61-62) the difference between the probe frequency and the sample frequency (10-100kHz) is equal to or near a resonant frequency of the mechanical oscillator.

Regarding claim 45, Holczer et al. disclose (see Figures 2, 4, 6 and 7) a method, comprising: using a probe radiation wave (B_0, B_1) at a probe frequency to excite a probe (26) to produce a probe polarization (see Figure 4); using a sample polarization wave (B_{MOD}, B_2) at a sample frequency to excite a sample to produce a sample polarization (see Figure 4); positioning the sample close to the probe to allow interaction (see Figure 4); engaging an oscillator (24) to the probe so that the oscillator moves in response to the interaction; using a detection radiation signal (from 30) at a detection frequency to illuminate the oscillator to produce a signal by light scattering at a scattered frequency which is a function of the sample frequency and the probe frequency (see column 18, lines 42-67). Holczer et al. inherently provides nonlinear wave mixing and a wave mixing signal since the same method steps are carried out.

Regarding claim 50, Holczer et al. disclose (see Figures 2, 4, 6 and 7) a method, comprising: using a probe excitation wave (B0 or B1) to illuminate an optically polarizable probe tip (24, 26), the tip responsive to produce a probe polarization (see Figure 4); and scanning (with 20) the probe tip in proximity of a sample (16) to interact with the sample with a sample polarization (see Figure 4) and to obtain measurements of different parts of the sample (with 30 and 32) from a force on the probe tip as a function of a frequency difference between frequencies of the probe polarization and the sample polarization (see column 18, lines 42-65).

Regarding claims 2-4 and 35, Holczer et al. further disclose (see Figures 2, 6, 7 and column 12, lines 12-19) the detection module includes a detecting device (30, 32) that measures a displacement of the mechanical oscillator and the detecting device includes a light source (30) to produce a detection optical wave to illuminate at least a portion of the mechanical oscillator, and a photodetector (32) to receive a scattered detection wave. Holczer et al. also disclose (see Figure 2 and column 12, lines 59-67) the probe module produces a probe excitation radiation wave (B_0) at a probe polarization frequency (static frequency) to effectuate the probe excitation field and a sample excitation wave (B_2 or B_{MOD}) at a sample excitation frequency, wherein the sample is responsive to the sample excitation wave to produce the sample polarization. The frequency of the detection wave is shifted due the interaction.

Regarding claim 29, Holczer et al. further disclose (see Figure 2) exposing the sample to a sample excitation field (B_{MOD} or B_2) to produce the sample polarization.

Regarding claims 6, 7, 32, 46, 47 and 49, Holczer et al. also disclose (see Figure 6 and column 18, lines 42-65) the probe frequency (B_0; static field; frequency = 0) and the sample frequency (B_{MOD}; frequency = 10-100kHz) are different from each other by an amount within a frequency response range of the mechanical oscillator (see column 13, lines 19-22; frequency = 10-100kHz). Holczer et al. further disclose (see column 13, lines 19-22 and column 18, lines 61-62) the amount (10-100kHz) is equal to or near a resonant frequency of the mechanical oscillator. Further, since a harmonic frequency is defined has an integer multiple of the resonant frequency, Holczer et al. does disclose

the amount is equal to or near a harmonic (first harmonic) frequency of the mechanical oscillator.

Regarding claims 14 and 16, Holczer et al. disclose (see Figure 7 and column 20, lines47-49) a feedback loop (98) to maintain the mechanical oscillator at a resonance condition. Holczer et al. also disclose (see column 19, lines 28-30) a spacing monitor mechanism (computer) to monitor a spacing between the probe and the sample.

Regarding claims 17 and 18, Holczer et al. disclose (see column 12, lines 5-8) the probe is spaced from the sample by less than one wavelength of radiation (1-10 Ångstroms). Holczer et al. further disclose (see column 13, lines 5-10) the mechanical oscillator has a dimension less than one wavelength of radiation ("thickness... 1 μm"). That is, as understood, since radio waves (a radiation) have a wavelength of 1 mm or more, the dimensions of 1-10 Ångstrom and 1 μm are less than a wavelength of radiation.

Regarding claim 34, Holczer et al. further disclose (see Figure 2) various other excitation fields (B_1 or B_2) to affect the motion of the mechanical oscillator.

Regarding claims 36-38, Holczer et al. further disclose (see Figure 2) scanning (20) the probe and the sample relative to each other to obtain an image of the sample. Holczer et al. also disclose (see Figure 6) modulating (72, 73) a probe frequency of the prove excitation wave (B_1). In addition, Holczer et al. disclose (see column 13, lines 51-53) the tip has a dimension in the Ångstrom scale. Thus, the tip is less than one wavelength of the probe excitation wave to allow for evanescent coupling.

Regarding claims 39 and 43, Holczer et al. further disclose (see Figures 2, 5-7) detecting motion (with 30 and 32) of the mechanical oscillator to measure a property of the sample at a first time (first spot at a first time); detecting motion of the oscillator to measure the property at a second time (second spot at a second time); and correlating measurements (topographical atomic structure picture) from the first and second times to determine the property (see column 19, lines 25-36). Holczer et al. also disclose (see Figure 6) a parameter (a frequency) associated with excitation of the probe or sample is adjusted (72-74) to have different values.

Regarding claim 44, the interaction between the sample and the probe inherently includes a dissipative interaction because the oscillations between the sample and the probe would slow down and eventually stop. Thus, a dissipative interaction must be present in the method and apparatus of Holczer et al.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 8, 10-13, 19 and 33, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Holczer et al.

Regarding claims 8 and 10, Holczer et al. disclose the claimed invention as set forth above. Holczer et al. further disclose the output of the radiation source is frequency modulated. Holczer et al. do not specifically disclose a radiation source

generates both the probe and sample excitation waves. However, the number of sources is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to consolidate radiation sources by providing a radiation source for both the probe and sample excitation waves in the apparatus of Holczer et al. to reduce costs.

Regarding claims 11-13, Holczer et al. disclose the claimed invention as set forth above, except for modulating at one half the frequency difference between the sample and probe frequencies, amplitude and polarization modulation. However, the type and frequency of modulation is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an optimal modulation frequency or to modulate the amplitude or polarization in the apparatus of Holczer et al. to provide optimal excitation or to distinguish the particular radiation from ambient radiation and improve detection.

Regarding claim 19, Holczer et al. disclose (see column 13, lines 4-10) the mechanical oscillator has a dimension (a length of 1 mm) greater than one wavelength of radiation. That is, as understood, since visible light waves (a radiation) have a wavelength of 750 nm-400 nm, the dimension of 1 mm is less than a wavelength of radiation. Holczer et al. further disclose (see Figure 2) excitation waves. Holczer et al. does not specifically disclose an inverse of a wavevector difference of incident radiation wave is less than the inverse of a dimension of the mechanical oscillator. However, the specific relationship between the excitation waves and the dimension of the mechanical oscillator is a mater of design choice. It would have been obvious to a person of

ordinary skill in the art at the time the invention was made to optimize the dimensions of the mechanical oscillator to respond to the excitation waves in the apparatus of Holczer et al. to improve sensitivity and detection.

Regarding claim 33, Holczer et al. disclose (see column 13, lines 19-22 and column 18, lines 61-62) the difference between the two frequencies is equal to or near a harmonic frequency (first harmonic) of the resonance frequency of the mechanical oscillator. Holczer et al. does not specifically disclose the harmonic frequency is a second harmonic of the resonance frequency. However, the specific harmonic at which the mechanical oscillator moves is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made have the difference between the two frequencies to be equal to or near a second harmonic frequency in the method of Holczer et al. to provide increased precision in movement of the mechanical oscillator and improve detection.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holczer et al. in view of Ludeke et al. (U.S. Patent 6,085,580).

Regarding claim 9, Holczer et al. disclose (see Figure 2) the radiation source includes magnetic field sources to produce the probe and sample excitation waves. Holczer et al. do not specifically disclose a laser to produce one of the sample and probe excitation waves and an acousto-optic modulator which modulates the laser to produce the other excitation wave. Ludeke et al. teach (see Figure 1) a laser (14) used to excite a sample and a modulator (15). The specific type of modulator is a matter of design choice. Thus, Ludeke et al. recognize that excitation can also be induced with a

laser source. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to consolidate the laser source with an acousto-optical modulator in the apparatus of Holczer et al. in view of Ludeke et al. to reduce costs. Further, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an acousto-optical modulator in the apparatus of Holczer et al. in view of Ludeke et al. to more reliably modulate radiation at higher frequencies.

11. Claims 15, 20-26, 40-42, 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holczer et al. in view of Takeda et al. (U.S. Patent 5,751,684).

Regarding claim 15, Holczer et al. disclose (see Figure 2) the system as claimed having one probe, as set forth above. Holczer et al. does not specifically mention a second probe. Takeda et al. teach (see Figure 3) of a system having multiple probes (1). Takeda et al. further teach (see column 2, lines 45-47) that multiple probes allows for high speed operation of the system. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide at least another probe in the apparatus of Holczer et al. in view of Takeda et al. to speed up the operation of the system and improve throughput.

Regarding claims 20, 21 and 24, Holczer et al. disclose (see Figures 2, 4, 6 and 7) a system, comprising: a radiation source (from 38; from 70, 72, 74 of Figure 6; from coil, not shown; see also column 12, lines 31 and 32) to produce at least a probe excitation wave (B_0 or B_1) at a probe frequency; a probe having a mechanical oscillator (24) to receive the probe excitation wave, to produce a probe polarization (see Figure 4); a sample holder (14, 20, 22) to hold a sample (16) with a sample polarization in a

proximity of the probe to expose the sample to fields produced by the probe polarization so as to cause motion of the mechanical oscillators from interaction between the probe polarization and the sample polarization (see column 14, lines 26-65); and a detector module (30, 32) to measure movement of the mechanical oscillator. Holczer et al. further disclose (see Figure 2) a detection radiation source (30) to produce a detection radiation wave to illuminate the mechanical oscillator, wherein the detector module collects and measures scattered detection radiation wave to determine movements of the mechanical oscillator. Holczer et al. also disclose (see Figures 2, 6 and 7) the sample holder (14, 20, 22) is movable to shift the sample relative to the probe. Holczer et al. further disclose (see Figures 4 and 6) the radiation source (70, 72, 74) produces at least another excitation wave (B_{MOD}) at a frequency different the probe frequency but coherent with the probe excitation wave (see column 18, lines 42-63) to produce an interference field over the mechanical oscillator (see Figure 4), the mechanical oscillator responsive to the interference field to produce polarizations (moments in Figure 4) representative of the interference field. Holczer et al. do not specifically disclose an array of mechanical oscillators. Takeda et al. teach (see Figure 3) of a system having multiple mechanical oscillators (2). Takeda et al. further teach (see column 2, lines 45-47) that multiple mechanical oscillators allows for high speed operation of the system. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide at least another probe in the apparatus of Holczer et al. in view of Takeda et al. to speed up the operation of the system and improve throughput.

Regarding claims 22 and 23, Holczer et al. in view of Takeda et al. further disclose the mechanical oscillators turning on and off (oscillating to and from the sample). Holczer et al. do not specifically disclose the mechanical oscillators being turned on and off according to a Hadamard matrix. However, Takeda et al. teach (see Figures) reading recorded information off of a disk. Further, since a Hadamard transform or matrix is an encoding scheme, it would have been obvious to a person of ordinary skill in the art at the time the invention was made for the mechanical oscillators to turn on and off according to a Hadamard matrix in the apparatus of Holczer et al. in view of Takeda et al. to provide better encoding of information and improve detection.

Regarding claims 25 and 26, Holczer et al. disclose the claimed invention as set forth above, except for the mechanical oscillators being operated to write and retrieve information recorded in the sample. Takeda et al. teach (see Figures) providing mechanical oscillators to write and read information recorded in a sample. Thus, Takeda et al. recognize that the mechanical oscillators can be used to obtain recorded information as well as structural information from a sample. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to write and read information recorded in a sample in the apparatus of Holczer et al. in view of Takeda et al. to provide increased compatibility with other types of samples.

Regarding claims 40, 42 and 48, Holczer et al. disclose (see column 19, lines 25-35) a probe (26) engaged to a mechanical oscillator (24) and correlating measurements to determine the property. Holczer et al. do not specifically disclose a second probe to a second mechanical oscillator. Takeda et al. teach (see Figure 3) of a system having

multiple mechanical oscillators (2) engaged to multiple probes (1). Takeda et al. also teach (see column 5, line 67) taking measurements at the same time (simultaneously). Takeda et al. further teach (see column 2, lines 45-47) that multiple mechanical oscillators allows for high speed operation of the system. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide at least another probe in the apparatus of Holczer et al. in view of Takeda et al. to speed up the operation of the system and improve throughput. Further, Holczer et al. do not specifically disclose using the same radiation wave to excite a second probe. However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the same radiation wave to excite the second probe in the method of Holczer et al. in view of Takeda et al. to consolidate radiation sources and reduce costs.

Regarding claim 41, Takeda et al. also teach (see column 5, line 67) taking measurements at the same time (simultaneously). Holczer et al. in view of Takeda et al. do not specifically disclose taking measurements from the probes at different times. However, the time at which measurements are read is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made take measurements at different times in the method of Holczer et al. in view of Takeda et al. to reduce the movement required of the sample and increase precision to improve detection.

Response to Arguments

12. Applicant's arguments filed December 2, 2002 have been fully considered but they are not persuasive.

Regarding claims 1-4 and 6-19, Applicant simply concludes that Holczer et al. do not disclose the claimed frequency relationship. Current claim 1 is an incorporated version of previous claim 5. As set forth in the last Office Action, previous claim 5 (current claim 1) is anticipated by Holczer et al. Contrary to Applicant's assertions, Holczer et al. do disclose the claimed frequency relationship. Thus, Applicant's conclusory statement is not found persuasive and the claim remains anticipated by Holczer et al. as set forth above.

Regarding claims 20-26, Applicant asserts that Holczer et al. do not disclose the claimed interference field. Current claim 20 is an incorporated version of previous claim 27. As set forth in the last Office Action, previous claim 27 (current claim 20) is obvious over Holczer et al. in view of Takeda et al. Contrary to Applicant's assertions, Holczer et al. do disclose the claimed interference field as set forth above.

Regarding claims 28, 29 and 32-44, Applicant asserts that Holczer et al. do not disclose the difference in frequencies being equal to or near the resonance frequency of the mechanical oscillator. As set forth above, Holczer et al. also disclose (see Figure 6 and column 18, lines 42-65) the probe frequency (B_0; static field; frequency = 0) and the sample frequency (B_{MOD}; frequency = 10-100kHz) are different from each other by an amount within a resonant frequency response range of the mechanical oscillator (see column 13, lines 19-22; frequency = 10-100kHz). The waves are coherent since the

phase differences between the two waves remain the same (between the static field and the changing field).

Regarding claims 45-49, Applicant asserts that the prior art does not disclose wave mixing. Examiner clarifies that wave mixing is inherent in Holczer et al. since the same method steps are carried out. As understood, the claimed steps are indistinguishable from the prior art.

Regarding claim 50, Applicant asserts that the prior art does not disclose scanning or a force on the tip acts as a function of a frequency difference. Examiner cites element 20 that acts as a scanner. Further, Holczer et al. disclose (see column 18, lines 42-65) the tip moving as a function of the frequency difference.

Thus, as set forth above, this rejection is proper.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X. Luu whose telephone number is (703) 305-0539. The examiner can normally be reached on Monday-Friday from 6:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta, can be reached on (703) 308-4852. The fax phone number for the organization where the application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

txl
March 25, 2003

Que T. Le
Primary Examiner